International Journal of Environmental and Science Education, 2016, vol.11, N9, pages 3029-3039

The technology of forming of innovative content for engineering education

Kayumova L., Savva L., Soldatchenko A., Sirazetdinov R., Akhmetov L.
Kazan Federal University, 420008, Kremlevskaya 18, Kazan, Russia

Abstract

© 2016 Fedorenko and Bykova. Open Access terms of the Creative Commons Attribution 4.0 International License.The relevance of the study is conditioned by the modernization of engineering education aimed at specialists' training to solve engineering and economic problems effectively. The goal of the paper is to develop the technology of the innovative content's formation for engineering education. The leading method to the study of this problem is a method of quantization that allows compressing of the information to be studied and to create training modules and taxa. The study involved 430 teachers, 410 students who expressed their requirements for the content of engineering education, participated in the development and evaluation of training modules and taxa. Main results of the research consist in identifying of the stages for selection and structuring of the content for engineering education, requirements for the content (compliance with the invariant structure of professional activities; the system integrity of knowledge, abilities, skills, competences; taking into account of innovative educational, scientific and industrial developments) and defining of the rules for structuring (the compliance with professional functions; the identification of invariant and variant components; development of training modules; taxonomic representation of interdisciplinary relations; system integrity of structure-forming components). The significance of the findings is that the identified stages of selection and structuring of the content for engineering education provide extensive use of technology (controllability) of its formation; content requirements-selection of knowledge, abilities, skills, competences at the level of specific academic disciplines and their systematization; the proposed rules for structuring-integration of educational and vocational activities of students and research and teaching activities of teachers. The developed technology contributes to the relevance and accessibility of the content for engineering education, reliability of future engineers' vocational training, which is manifested in their readiness for multi-functional engineering and technical activities.

http://dx.doi.org/10.12973/ijese.2016.901a

Keywords

Engineering education, Selection and structuring of educational content, Training module